FIG. 1

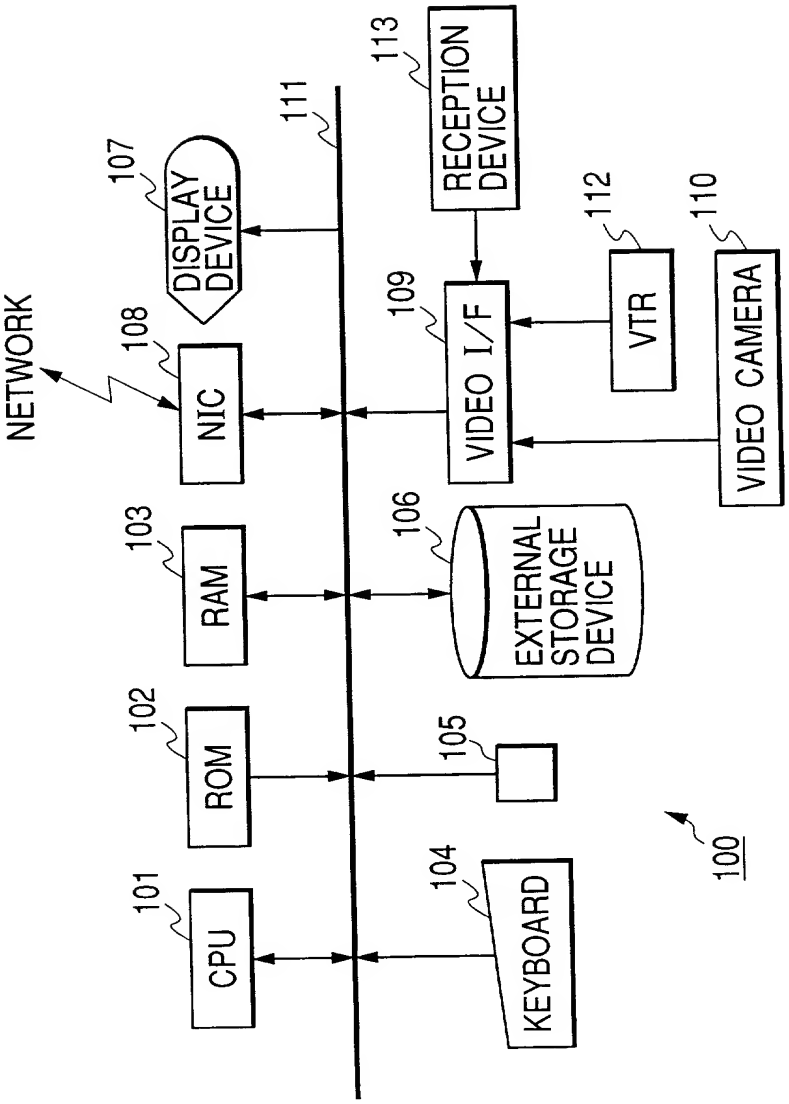

NETWORK
CPU
ROM
RAM
NIC
DISPLAY DEVICE
KEYBOARD
EXTERNAL STORAGE DEVICE
VIDEO I/F
RECEPTION DEVICE
VTR
VIDEO CAMERA
101
102
103
104
105
106
107
108
109
110
111
112
113
100

FIG. 2

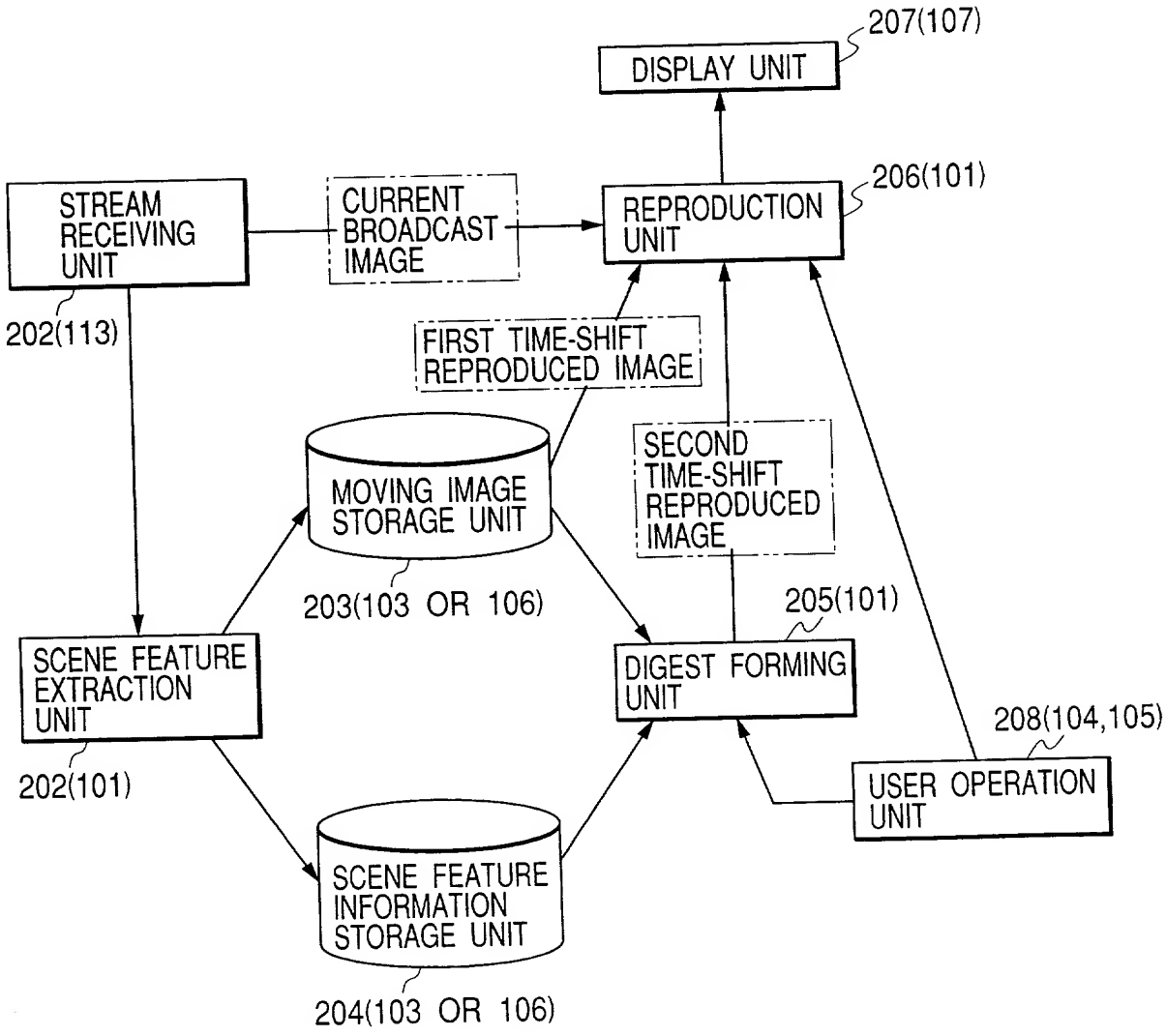

207(107)
DISPLAY UNIT
206(101)
REPRODUCTION UNIT
STREAM RECEIVING UNIT
CURRENT BROADCAST IMAGE
202(113)
FIRST TIME-SHIFT REPRODUCED IMAGE
MOVING IMAGE STORAGE UNIT
SECOND TIME-SHIFT REPRODUCED IMAGE
203(103 OR 106)
205(101)
SCENE FEATURE EXTRACTION UNIT
DIGEST FORMING UNIT
208(104,105)
202(101)
USER OPERATION UNIT
SCENE FEATURE INFORMATION STORAGE UNIT
204(103 OR 106)

FIG. 3

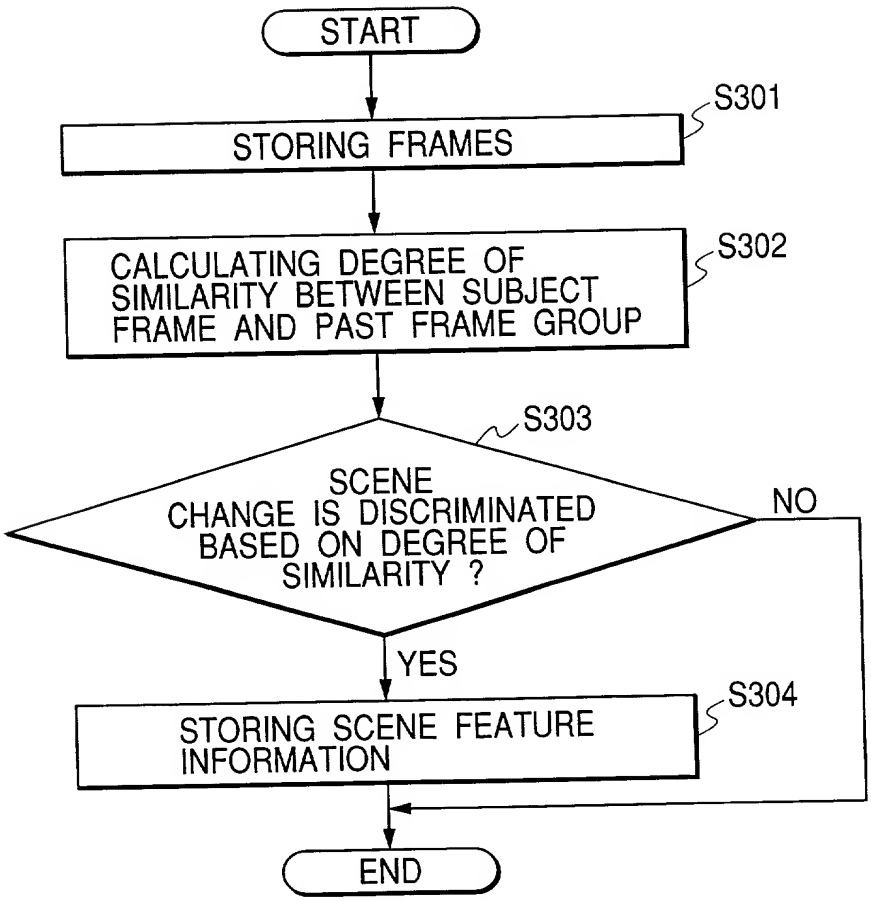

START
S301
STORING FRAMES
S302
CALCULATING DEGREE OF SIMILARITY BETWEEN SUBJECT FRAME AND PAST FRAME GROUP
S303
SCENE CHANGE IS DISCRIMINATED BASED ON DEGREE OF SIMILARITY ?
NO
YES
S304
STORING SCENE FEATURE INFORMATION
END

FIG. 4

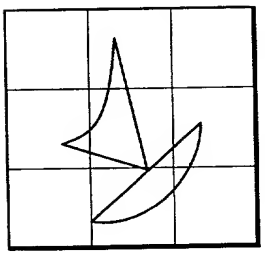


FIG. 5

| SCENE ID | LEADING FRAME ID | SCENE LENGTH | INTENCE OF SCENE |
|---|---|---|---|
| 1 | 1 | 90 | 90 |
| 2 | 91 | 180 | 53 |
| 3 | 181 | 360 | 85 |
| ⋮ | ⋮ | ⋮ | ⋮ |

FIG. 6

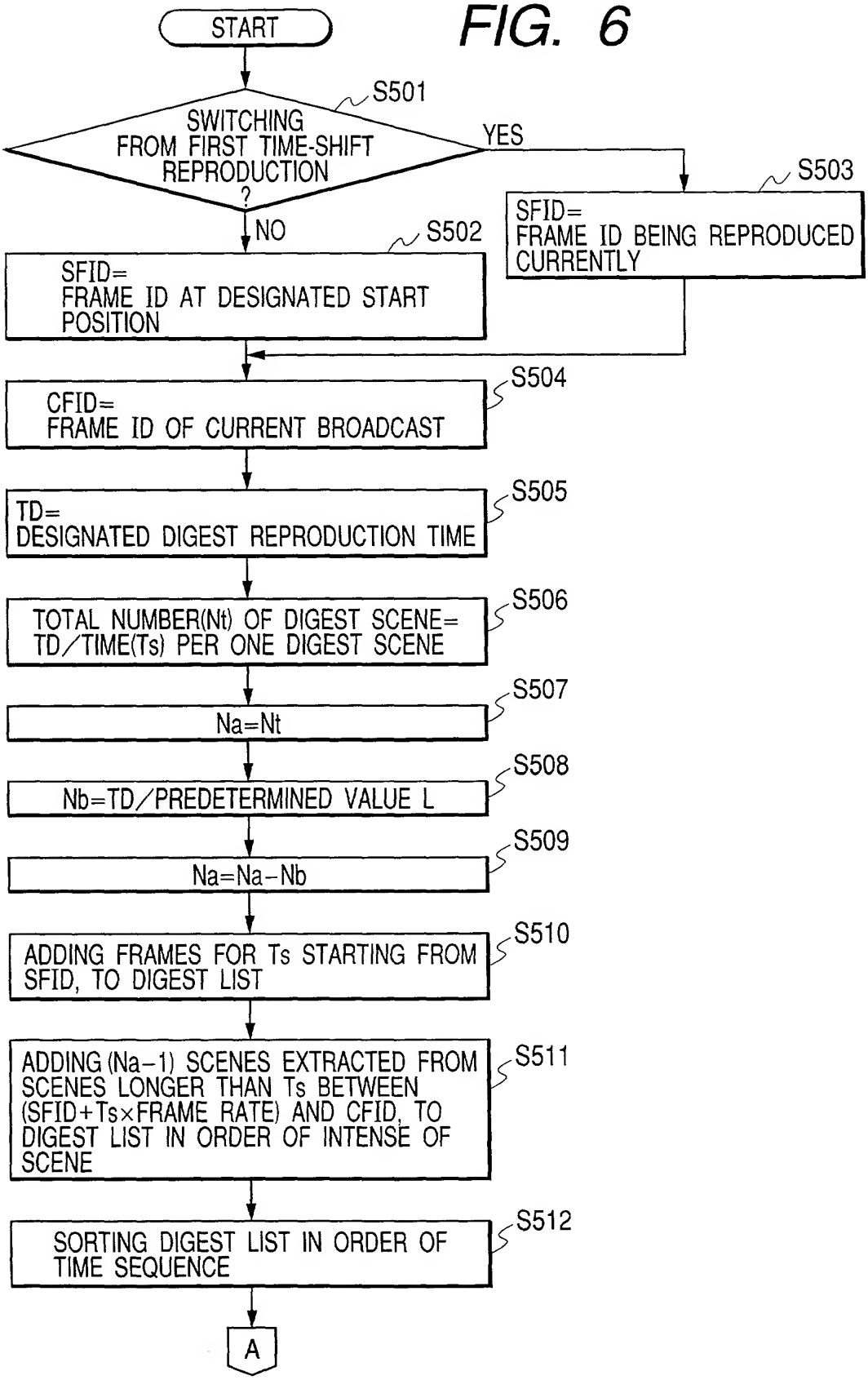

START
S501
SWITCHING FROM FIRST TIME-SHIFT REPRODUCTION ?
YES
NO
S502
SFID= FRAME ID AT DESIGNATED START POSITION
S503
SFID= FRAME ID BEING REPRODUCED CURRENTLY
S504
CFID= FRAME ID OF CURRENT BROADCAST
S505
TD= DESIGNATED DIGEST REPRODUCTION TIME
S506
TOTAL NUMBER(Nt) OF DIGEST SCENE= TD/TIME(Ts) PER ONE DIGEST SCENE
S507
Na=Nt
S508
Nb=TD/PREDETERMINED VALUE L
S509
Na=Na-Nb
S510
ADDING FRAMES FOR Ts STARTING FROM SFID, TO DIGEST LIST
S511
ADDING (Na-1) SCENES EXTRACTED FROM SCENES LONGER THAN Ts BETWEEN (SFID+Ts×FRAME RATE) AND CFID, TO DIGEST LIST IN ORDER OF INTENSE OF SCENE
S512
SORTING DIGEST LIST IN ORDER OF TIME SEQUENCE
A

FIG. 7

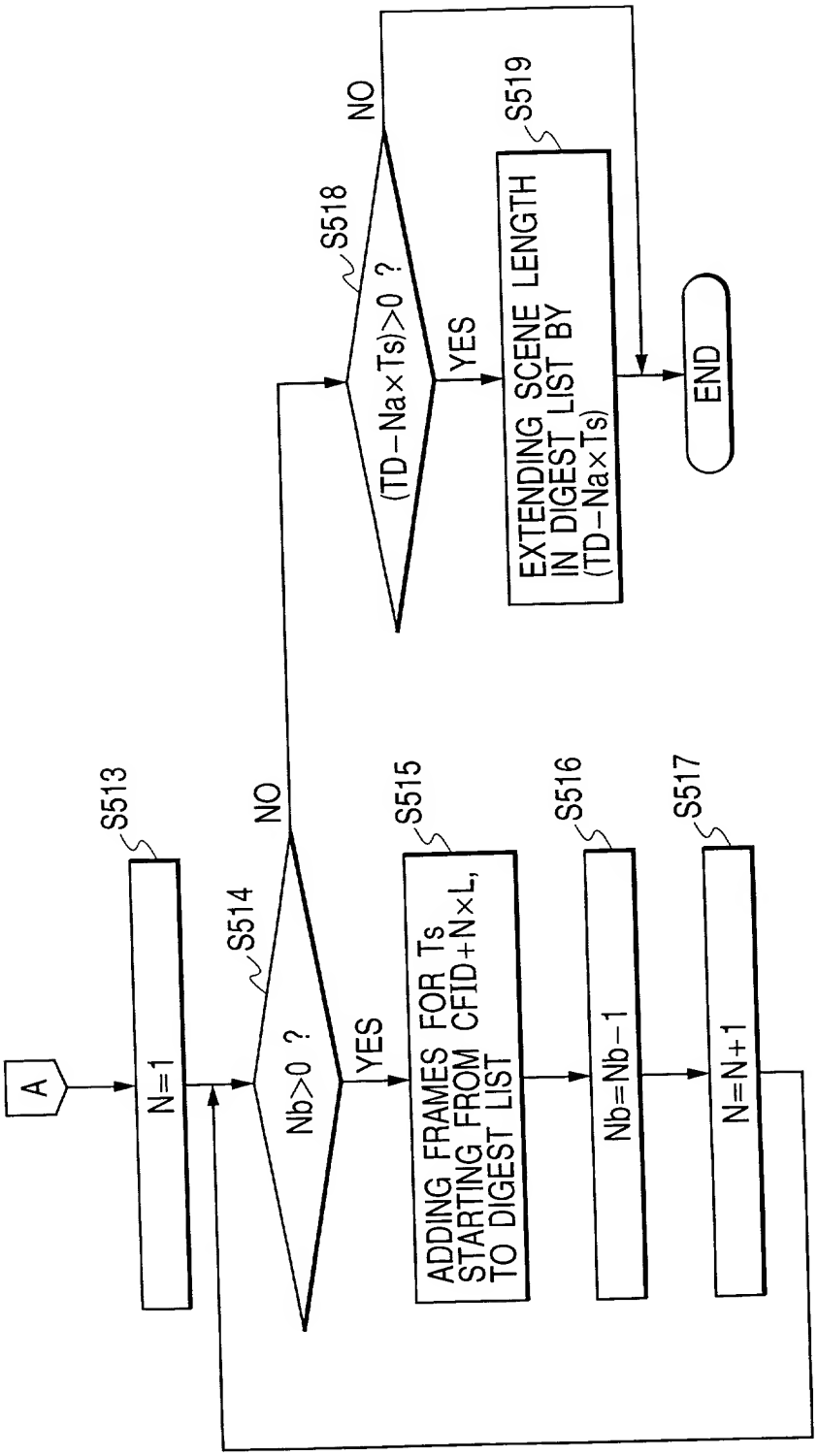

A
S513
N=1
S514
Nb>0 ?
NO
YES
S515
ADDING FRAMES FOR Ts STARTING FROM CFID+N×L, TO DIGEST LIST
S516
Nb=Nb−1
S517
N=N+1
S518
(TD−Na×Ts)>0 ?
NO
YES
S519
EXTENDING SCENE LENGTH IN DIGEST LIST BY (TD−Na×Ts)
END

FIG. 8

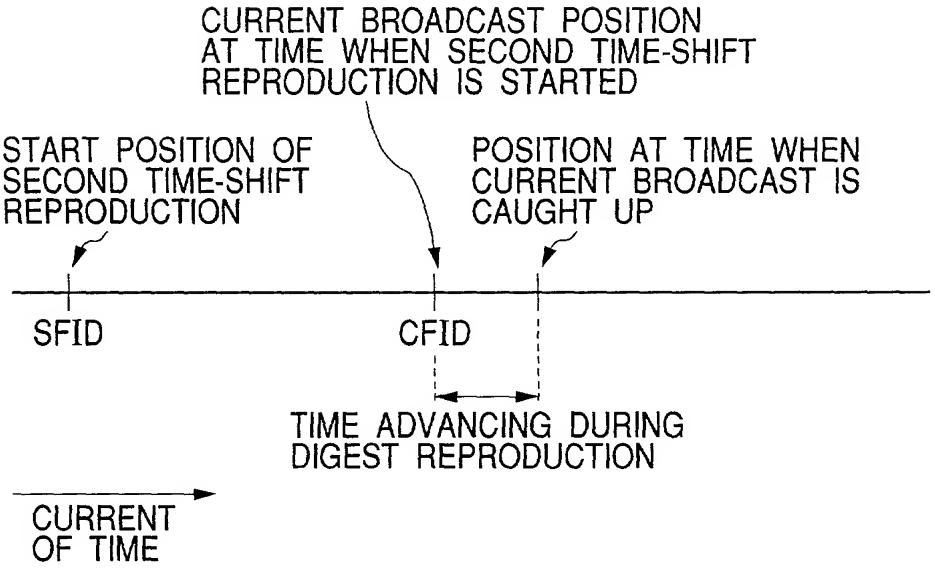
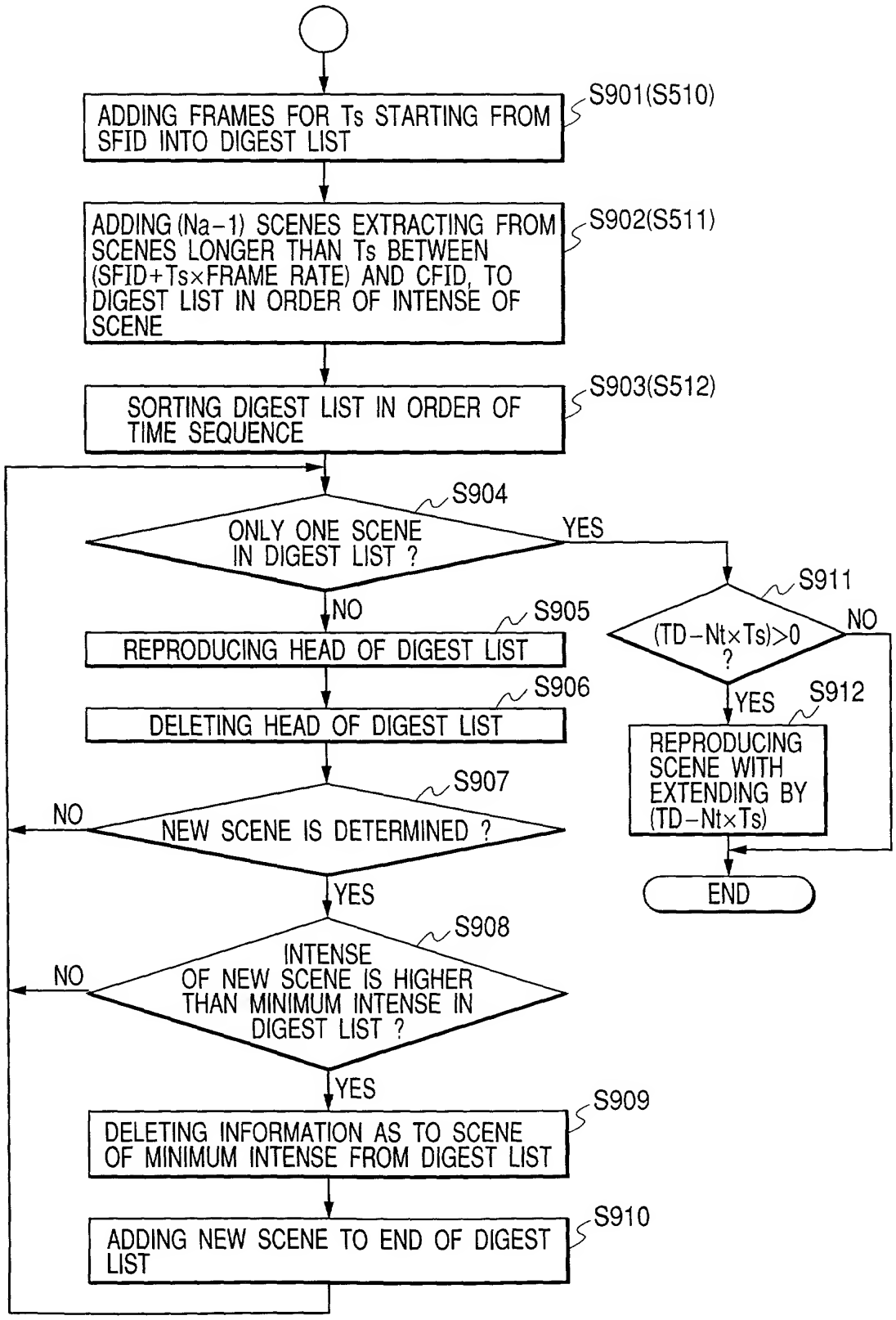



FIG. 9

| START FRAME ID | LENGTH |
|---|---|
| 501 | 60 |
| 811 | 60 |
| 1001 | 60 |
| ⋮ | ⋮ |

FIG. 10


ADDING FRAMES FOR Ts STARTING FROM SFID INTO DIGEST LIST
S901(S510)
ADDING (Na-1) SCENES EXTRACTING FROM SCENES LONGER THAN Ts BETWEEN (SFID+Ts×FRAME RATE) AND CFID, TO DIGEST LIST IN ORDER OF INTENSE OF SCENE
S902(S511)
SORTING DIGEST LIST IN ORDER OF TIME SEQUENCE
S903(S512)
S904
ONLY ONE SCENE IN DIGEST LIST ?
YES
NO
S905
REPRODUCING HEAD OF DIGEST LIST
S906
DELETING HEAD OF DIGEST LIST
S907
NEW SCENE IS DETERMINED ?
NO
YES
S908
INTENSE OF NEW SCENE IS HIGHER THAN MINIMUM INTENSE IN DIGEST LIST ?
NO
YES
S909
DELETING INFORMATION AS TO SCENE OF MINIMUM INTENSE FROM DIGEST LIST
S910
ADDING NEW SCENE TO END OF DIGEST LIST
S911
(TD-Nt×Ts)>0 ?
NO
YES
S912
REPRODUCING SCENE WITH EXTENDING BY (TD-Nt×Ts)
END

EP 0 952 694 A2

FIG. 11

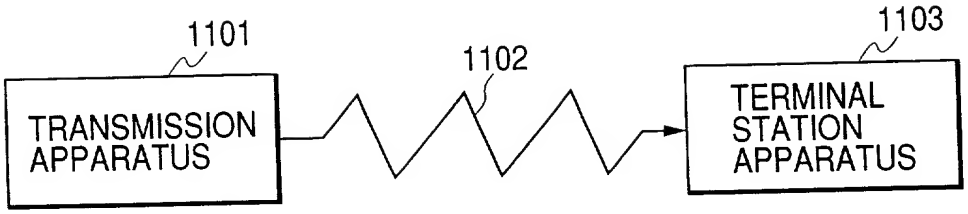


FIG. 12

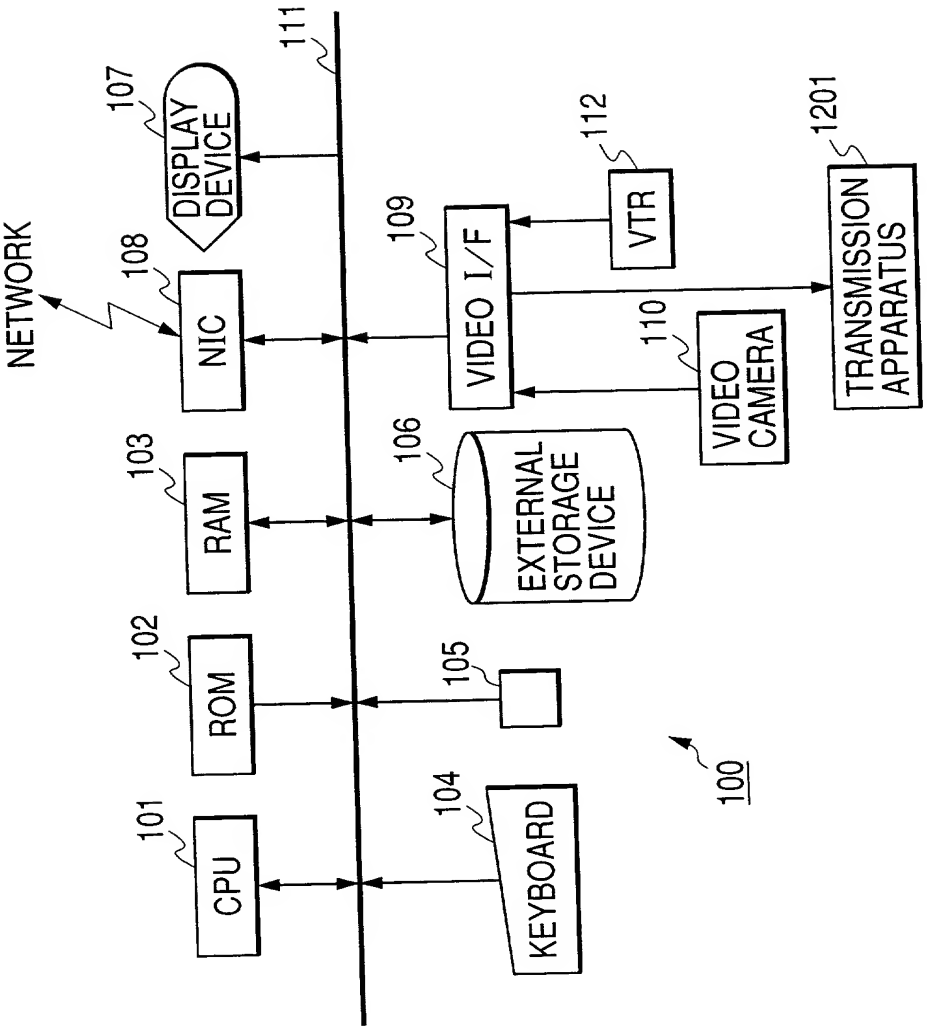

NETWORK
111
107
DISPLAY DEVICE
108
NIC
109
VIDEO I/F
112
VTR
1201
TRANSMISSION APPARATUS
103
RAM
106
EXTERNAL STORAGE DEVICE
110
VIDEO CAMERA
102
ROM
105
101
CPU
104
KEYBOARD
100

FIG. 13

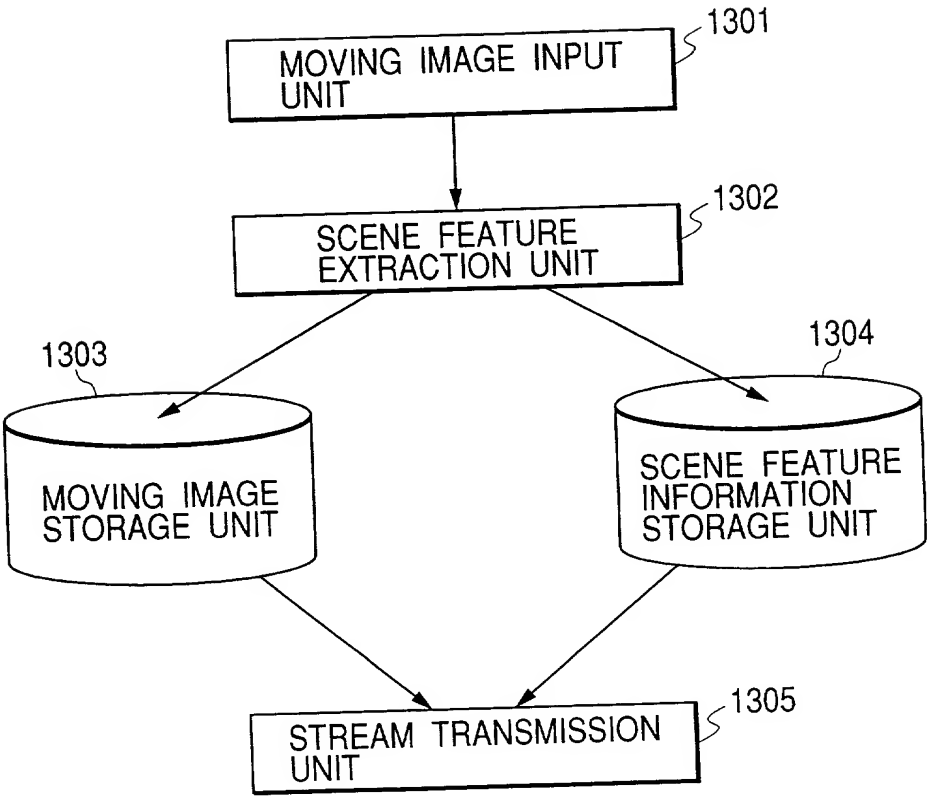
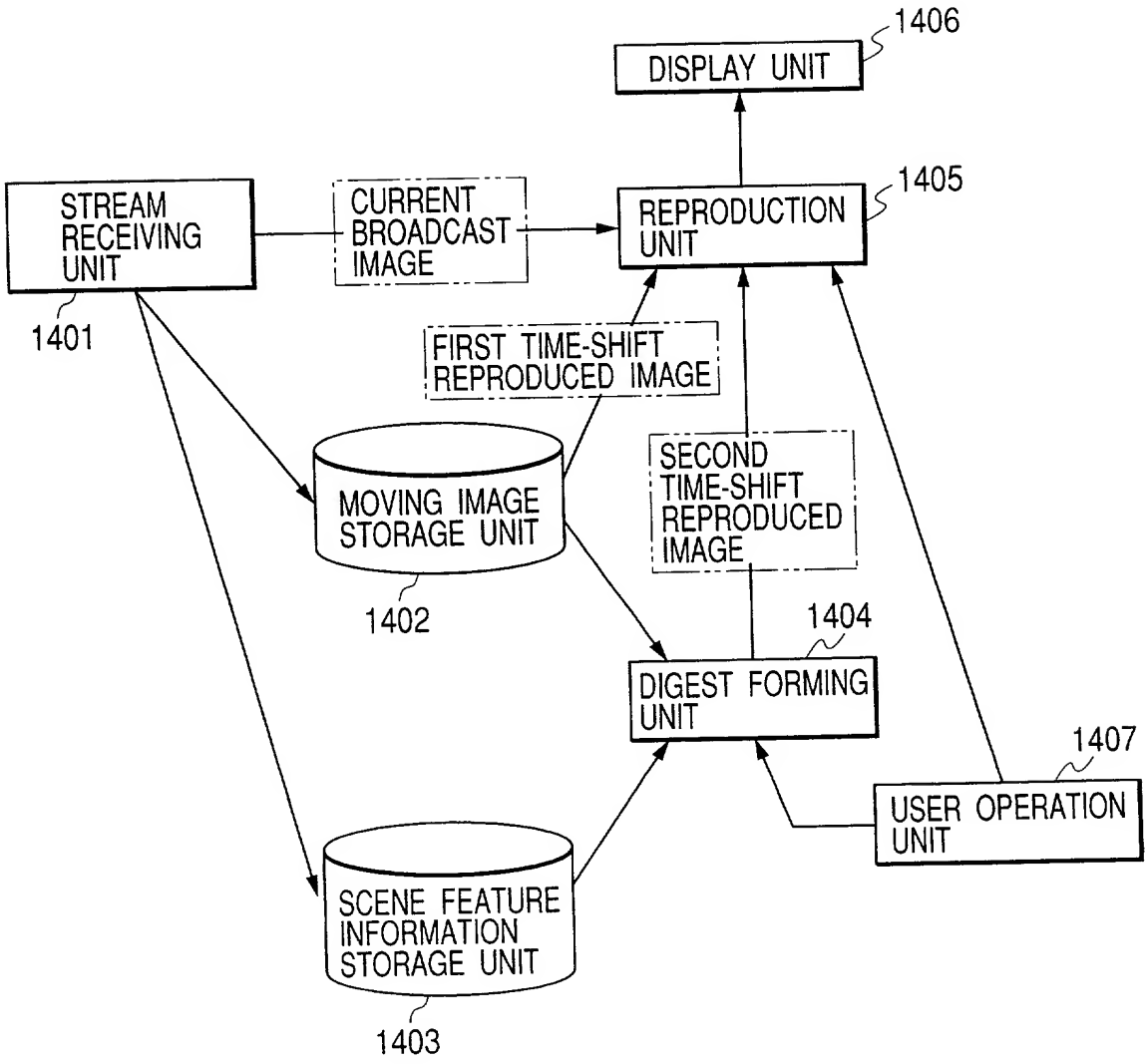

MOVING IMAGE INPUT UNIT
1301
SCENE FEATURE EXTRACTION UNIT
1302
1303
MOVING IMAGE STORAGE UNIT
1304
SCENE FEATURE INFORMATION STORAGE UNIT
STREAM TRANSMISSION UNIT
1305

FIG. 14


1406
DISPLAY UNIT
1405
REPRODUCTION UNIT
STREAM RECEIVING UNIT
1401
CURRENT BROADCAST IMAGE
FIRST TIME-SHIFT REPRODUCED IMAGE
MOVING IMAGE STORAGE UNIT
1402
SECOND TIME-SHIFT REPRODUCED IMAGE
1404
DIGEST FORMING UNIT
1407
USER OPERATION UNIT
SCENE FEATURE INFORMATION STORAGE UNIT
1403